ANDREA PETRI

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EDUCATION

Columbia University, Graduate School of Arts and Sciences *August 2011 - present*
PhD. Physics *expected June 2017*
M.Phil. Physics *June 2014*
M.A. Physics *June 2013*
Relevant coursework:
Advanced Programming Statistical Mechanics Quantum Mechanics
Physical Cosmology Classical Fields and Waves Quantum Field Theory

Scuola Normale Superiore, Classe di Scienze, Pisa, Italy *September 2006 - July 2011*
M.S. Physics *July 2011*
B.A. Physics *June 2009*

PROGRAMMING EXPERIENCE

Software developer Fall 2013 - Present
Columbia University, NY

- Developed the LensTools Python library, that will prove useful in Weak Gravitational Lensing data analyses, with particular focus on ray-tracing simulations, astrophysical image analysis, data reduction and statistical inferences of model parameters from observations[1]
- Implemented from scratch the client and server side components of a three tier simple database service, using the C language socket API (code repository available on request)

Supercomputing Spring 2014 - Present
Columbia University, NY

- Actively participated in a supercomputing research project on Cosmology from Non-Linear Weak Lensing at the Extreme Science and Engineering Discovery Environment (XSEDE[2]), with more than 1.5 million CPU hours awarded
- Planned, directed and executed the production of a 30TB simulated dataset featuring lensed galaxy catalogs and Dark Matter density maps

Morgan Stanley - Institutional Equity Division June 2015 - August 2015, June 2016 - August 2016
Electronic Market Making (EMM) desk *New York*

- Analyzed impact of systematic risk exposure on EMM portfolios traded in US equity markets during 2015
- Developed back test and real time analysis software tools to monitor EMM portfolio risk exposure
- Analyzed stock market historical data, with particular focus on US equity market trades from 2009 to 2014
- Developed mathematical models and algorithms for intra–day volume forecasts

ACADEMIC EXPERIENCE

Research Summer 2012 - Present
Astrophysics – Large Scale Structure of the Universe *Columbia University, NY*

- Served as peer reviewer for the American Astronomical Society (AAS) and for the journal Monthly Notices of the Royal Astronomical Society (MNRAS)
- Conducted statistical analysis of Cosmological Large Scale Structure simulated images, with particular emphasis on the development and implementation of new techniques to constrain physical model parameters

[1] project URL `http://lenstools.rtfd.io`
[2] `https://www.xsede.org/active-xsede-allocations`

- Worked on Cosmic Microwawe Background (CMB) data analysis, with particular focus on temperature image reconstruction starting from raw time ordered data (bolometric and pointing)
- Contributed to the development of CMB map-making software, implemented the corrections for pointing and calibration offsets

Teaching Fall 2012 - Present
Graduate student instructor *Columbia University, NY*

- Designed and taught as co-instructor a Modern Cosmology class aimed at high school students in the Columbia Science Honors Program (SHP `http://www.columbia.edu/cu/shp/`)
- Taught several Physics Laboratory introductory courses aimed at pre-medical and engineering track students

AWARDS

- Co-recipient of the Allan M. Sachs Teaching Award for contributions to the educational programs in the Columbia University Physics Department (May 2016)
- Bronze medalist, 37th International Physics Olympiad, Singapore (July 2006)

SKILLS

Mathematical tools	Linear algebra, bayesian statistics, image processing
Programming Languages	Python, C/C++, Fortran90, Bash, R
Protocols & APIs	Object Oriented Programming, Parallel Computing (MPI), TCP/IP sockets, HTTP
Databases	MySQL
Tools	Distributed source control (git, mercurial)
Languages	Italian (native), French (intermediate)